UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/933,805	08/22/2001	Tatuya Ninomiya	500.33021CX5	8027

24956 7590 02/11/2005	EXAMINER	
MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.	PATEL, HETUL B	
1800 DIAGONAL ROAD		
SUITE 370	ART UNIT	PAPER NUMBER
ALEXANDRIA, VA 22314	2186	

DATE MAILED: 02/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>03</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 January 2005*.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *21,23,24,26,27,29-32,34-39 and 41-55* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21,23,24,26,27,29-32,34-39 and 41-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All   b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____.

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date *01/21/05*.

4)☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____ .
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____.

DETAILED ACTION

Specification

1.   This action is responsive to communication filed on January 21, 2005.

2.   IDS filed on January 21, 2005 has been considered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 21, 23-24, 26-27, 29-32, 37-40, 46-47 and 52-53 are rejected under 35

U.S.C. 103(a) as being unpatentable over Hashemi et al. (USPN: 5,337,414),

hereinafter Hashemi in view of Nakamura et al. (USPN: 5,388,013) hereinafter,

Nakamura.

As per claims 21, 24 and 40, Hashemi teaches the invention as claimed,

including a storage system comprising:

-      a plurality of host adaptors coupled to at least one host device, which from

   interfaces for the host device (e.g. see figure 1, elements 4a-d and 8c1 and 8c2,

   column 3, lines 57-60 and 66-68; column 4, lines 1, 11-15 and column 9, lines 4-

   9);

- a plurality of storage devices for storing therein data received from the host

   device (e.g. see column 9, lines 30-34);

- a plurality of disk adaptors each coupled to one of said storage devices, which

   form interfaces for said storage devices (e.g. see figure 1, elements 8d1 and 8d2,

   column 4, lines 27-43; column 9, line 62 and column 10, lines 24-30);

- a cache (a plurality of caches) for temporarily storing therein data transferred

   between said host adaptors and said disk adaptors (e.g. see figure 1a, elements

   24c1 or 24c2 or 24d1 or 24d2);

- two buses coupled to said host adaptors, said disk adaptors, and said cache, and

   which operate as a pair of buses for transferring data among said host adaptors,

   said disk adaptors, and said cache, wherein each bus in said two buses is

   adapted to transfer different data (e.g. see figure 1a, elements 6a-b), and a

   memory for storing information indicating status which of said two buses is

   available for use due to a failure in the other of said two buses (e.g. see column

   9, lines 28-41), and

- wherein upon failure one of said two buses is used based on said status

   information stored in said memory (e.g. see the abstract and Col. 2, lines 2-5;

   Col. 3, lines 52-56).

Hashemi teaches the storage system as described above. However, Hashemi

does not teach the further limitation of each of said host adaptors includes a format

converter to convert data from CKD format to the FBA format and storing the FBA

format data in the cache memory. Nakamura, on the other hand, teaches a host

adapter (the magnetic disk controller, 5 in Fig. 1) includes a data storage format

converter that is used to convert data of a count key data (CKD) format sent from the

host device (the host computer, 1 in Fig. 1) into data of a fixed block architecture (FBA)

format and sending the converted data of the FBA format to said cache memory (6 in

Fig. 1) (e.g. see Col. 11, lines 12-17 and Fig. 1). Accordingly, it would have been

obvious to one of ordinary skill in the art at the time of the current invention was made

to employ the format converter as taught by Nakamura in the storage system of

Hashemi so the data stored in a CKD format (variable length record format adopted in

a magnetic disc system of a general-purpose computer) sent from the host device is

converted into data of a FBA format (fixed length format which is adopted in a

commercially available miniature type magnetic disc) suitable for the storage devices.

By doing so, it would provide improved compatibility by allowing Hashemi's storage

system (a) to serve broader range of applications, (b) to be compatible with wide

variety of storage devices with different formats (e.g. Magnetic disks, optical disks,

flash memory etc.). Therefore, it is being advantageous.

As for claims 23 and 26, Hashemi discloses the claimed invention as described

above and furthermore, Hashemi teaches that said memory can be referred to by an

external processor (e.g. see column 9, line 1 et seq.).

As per claims 27, 37 and 51, Hashemi teaches the invention as claimed,

including a storage system comprising:

- a plurality of host adaptors coupled to at least one host device, which from

    interfaces for the host device (e.g. see figure 1, elements 4a-d and 8c1 and 8c2,

column 3, lines 57-60 and 66-68; column 4, lines 1, 11-15 and column 9, lines 4-

9);

- a plurality of storage devices for storing therein data transferred from the host

device (e.g. see column 9, lines 30-34);

- a plurality of disk adaptors coupled to said storage devices, which form interfaces

for said storage devices (e.g. see figure 1, elements 8d1 and 8d2, column 4,

lines 27-43; column 9, line 62 and column 10, lines 24-30);

- at least one cache memory unit (a plurality of caches) for temporarily storing

therein data transferred between said host adaptors and said disk adaptors (e.g.

see figure 1a, elements 24c1 or 24c2 or 24d1 or 24d2); and

- at least one path, coupled to said host adaptors, said disk adaptors, and said at

least one cache memory unit, which transfers data among said host adaptors,

said disk adaptors, and said at least one cache memory unit (e.g. see column 9,

lines 28-41 and Fig. 1).

Hashemi teaches the storage system as described above. However, Hashemi

does not teach the further limitation of each of said host adaptors includes a format

converter to convert data from CKD format to the FBA format and storing the FBA

format data in the cache memory. Nakamura, on the other hand, teaches a host

adapter (the magnetic disk controller, 5 in Fig. 1) includes a data storage format

converter that is used to convert data of a count key data (CKD) format sent from the

host device (the host computer, 1 in Fig. 1) into data of a fixed block architecture (FBA)

format and sending the converted data of the FBA format to said cache memory (6 in

Fig. 1) (e.g. see Col. 11, lines 12-17 and Fig. 1). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the current invention was made to employ the format converter as taught by Nakamura in the storage system of Hashemi so the data stored in a CKD format (variable length record format adopted in a magnetic disc system of a general-purpose computer) sent from the host device is converted into data of a FBA format (fixed length format which is adopted in a commercially available miniature type magnetic disc) suitable for the storage devices. By doing so, it would provide improved compatibility by allowing Hashemi's storage system (a) to serve broader range of applications, (b) to be compatible with wide variety of storage devices with different formats (e.g. Magnetic disks, optical disks, flash memory etc.). Therefore, it is being advantageous.

As per claim 29, Hashemi discloses the claimed invention as described above and furthermore, Hashemi teaches the storage system further comprising a shared memory unit (CIM/DIM in Figs. 1A and 1B) which stores therein control information for controlling the host adaptors, the disk adaptors and said at least one cache memory unit. (e.g. see Col. 3, lines 24-33 and Figs. 1A and 1B).

As per claim 30, Hashemi discloses the claimed invention as described above and furthermore, Hashemi teaches the storage system wherein said at least one cache memory unit (buffers 24c1-2 and 2d1-2 in Fig. 1A) has a plurality of cache memories arranged in a duplexed form, and the shared memory unit (CIM/DIM) has a plurality of shared memories arranged in a duplexed form (e.g. see Fig. 1A).

As per claims 31-32, 38-39, 46-47 and 52-53, Hashemi discloses the claimed

invention as described above and furthermore, Hashemi teaches the storage system

wherein said at least one path (Futurebuses 6a and 6b in Fig. 1A) is a duplexed

common bus, which includes:

- a control information bus coupled to the host adaptors and the disk

     adaptors, which transfers control information, and

- a data transfer bus, coupled to the host adaptors, the disk adaptors and

     the at least one cache memory unit, which transfers data among the host

     adaptors, the disk adaptors and the at least one cache memory unit (e.g.

     see Fig. 1A and Col. 3, lines 50-65).

4.   Claims 34-35, 41-42, 48-49 and 54-55 are rejected under 35 U.S.C. 103(a) as

being unpatentable over Hashemi in view Nakamura, further in view of Cheney et al.

(USPN: 5,285,456), hereinafter, Cheney.

As per claims 34, 41, 48 and 54, the combination of Hashemi and Nakamura

disclose the claimed invention as described above wherein the format converter

converts data of CKD into data of FBA format. However, Hashemi and Nakamura fail to

teach that the format converter adds a longitudinal redundancy check (LRC) code to the

data of the FBA format. Cheney, on the other hand, teaches that by adding the LRC

code to the data, integrity of the control information can be verified (e.g. see Col. 4, lines

9-14). Accordingly, it would have been obvious to one of ordinary skill in the art at the

time of the current invention was made to modify the storage system of Hashemi by

adding the CRC code to the data as taught by Cheney. In doing so, it would allow the

integrity of the information data and the control information to be verified when they are

transferred within the system; therefore, enhancing the system's reliability.

As per claims 35, 42, 49 and 55, the combination of Hashemi and Nakamura

disclose the claimed invention as described above. However, Hashemi and Nakamura

fail to teach that the host adaptors receive the physical address information in the CKD

format with the cyclic redundancy check (CRC) code on a storage space of the storage

device. Cheney, on the other hand, teaches that by adding the CRC code to the data,

the errors generated during transmitting the data from the host devices to the storage

devices can be detected (e.g. see Col. 2, lines 40-62). Accordingly, it would have been

obvious to one of ordinary skill in the art at the time of the current invention was made to

modify the storage system of Hashemi by adding the CRC code to the data as taught by

Cheney. In doing so, it would allow the integrity of the information data and the control

information to be verified when they are transferred within the system; therefore,

enhancing the system's reliability.

5.   Claims 36 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Hashemi in view Nakamura, further in view of Dixon et al. (USPN: 4,637,024),

hereinafter, Dixon.

As per claims 36 and 50, the combination of Hashemi and Nakamura disclose

the claimed invention as described above. However, Hashemi and Nakamura, fail to

teach that the format converter adds the ECC and CRC code to the data before writing

it to the storage devices. Dixon, on the other hand, teaches that by using the CRC code,

the data can be checked/verified for any errors and if any error found in the data, using

the ECC, that error can be fixed (e.g. see Col. 3, lines 24-39). Accordingly, it would

have been obvious to one of ordinary skill in the art at the time of the current invention

was made to employ the step of adding the ECC and CRC code to the data before

storing it to the storage devices as taught by Dixon in the system taught by Hashemi

and Nakamura. In doing so, the data get checked and corrected before it get stored in

the storage device.

Conclusion

This is a continuation of applicant's earlier Application No. 09/933,805. All claims

are drawn to the same invention claimed in the earlier application and could have been

finally rejected on the grounds and art of record in the next Office action if they had

been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL**

even though it is a first action in this case. See MPEP § 706.07(b). Applicant is

reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hetul Patel whose telephone number is 571-272-4184. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on 571-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HBP
HBP

MATTHEW ANDERSON
PRIMARY EXAMINER
GROUP 2100